

## ASSESSMENT OF NUTRITIONAL STATUS OF ADOLESCENT GIRLS OF MEDCHAL MANDAL RANGAREDDY DISTRICT

PRASHANTHI MEDA<sup>1</sup> & T. KAMALAJA<sup>2</sup>

<sup>1</sup>Senior Research Fellow, Department of Foods and Nutrition, College of Home Science, Hyderabad,

Professor Jayashankar Telangana State Agricultural University, Telangana, India

<sup>2</sup>Assistant Professor, Department of Foods and Nutrition, Faculty of Home Science,

Professor Jayashankar Telangana State Agricultural University, Telangana, India

### ABSTRACT

*Adolescence is a period of rapid growth and in girls; proper development during this period plays an important role in the successful outcome of pregnancy and lactation in the future. Increased demands coupled with losses from the body increases the need for various nutrients during this period. Adolescence is the right period to correct these deficiencies. Medchal mandal of Ranga Reddy district, where the World Bank ICDS project was in operation, was selected for the study. Adolescent girls (n = 68) of 14-16 years age group were selected. Anthropometric measurements were taken using standard methods and the results showed 64.7% of the subjects were malnourished. Diet survey was conducted to assess their food and nutrient intake of subjects and the results revealed the energy and protein intake was 70% deficit. Iron and calcium intake was deficient by 50% and vitamin A by 30%. The food frequency results revealed that the cereal intake was regular; pulse intake was on alternate days. Whereas intake of green leafy vegetables, fruits and other vegetables were very low. The health and nutritional status of adolescent girls was improved through nutrition education along with supplementation.*

**KEYWORDS:** Adolescent Girls, Food and Nutrient Intake, Anthropometry, Malnourished & Haemoglobin (Hb)

**Received:** Jul 27, 2017; **Accepted:** Aug 12, 2017; **Published:** Aug 16, 2017; **Paper Id.:** IJASRAUG201796

### INTRODUCTION

Adolescence comprises nearly half of the growing up period in human beings. Adolescence is a peculiar evolutionary stage for human being, which is not a mere transition between childhood and adult age, because the whole process of individual's bio-physiological maturation culminates during this phase (Brasilla, 1993). The term adolescence has been defined by WHO (1989) as the period between 10-19 years, in India and it has been defined to be 10-18 years (NIPPCD, 1989). The onset of menstruation is regarded as the culmination of the transitional stage in girl's development. Rapid growth with profound, complex, and interrelated changes occur which play an important role in the successful outcome of pregnancy and lactation at later period. It is the period when nutritional demands increase and deficiency has long lasting effect not only on the individual's life, but also on future generations. As expressed by Kofi Annan, Former UN Secretary General, "Sound nutrition can change children's lives, improve their physical and mental development, protect their health and lay a firm foundation for future productivity." One of the major factors determining the nutritional status of any community is food consumption. This is influenced by wide range of factors like agro climatic differences, foods grown and the availability. The nutritional status is mainly determined by intake of particular nutrient, its bioavailability and presence of enhancers in the food. During the adolescence period, the need for protein and energy increased to meet the demands of growing body. The deficient intake during this period results

in malnutrition.

Adolescence is the best period to correct nutritional deficiencies, so the data on nutritional status of this group is required. Hence, the present study was conducted to assess the nutritional status of the adolescent girls between 14-16 years age.

## MATERIALS AND METHODS

The study was conducted in five villages randomly selected from Medchal mandal of Ranga Reddy district, Andhra Pradesh, where a World Bank aided ICDS project was in operation. The list of adolescent girls in the age group of 14 - 16 years in each village was obtained from the Community Health Volunteers of the village. Informed oral consent was obtained from the parents of the girls included in the study. General information about the family and details of the individual subject were collected by interview method using a structured and tested schedule. The twenty four hour recall method of diet survey was used to collect information on the dietary intake of the subject (Thimmayamma and Rao 1969). The adequacy of the foods in terms of the quality was obtained by comparing with recommended dietary allowances (Dietary Guidelines for Indians, 1999) and the nutrient adequacy in relation to RDA was calculated.

Anthropometric measurements were taken using standard methods. Mean anthropometric measurements (height and weight) were compared with NCHS standards. BMI was calculated to assess the nutritional status of the study group. Blood samples were collected by a trained technician using standard procedures. The blood sample was transferred to an amber colored bottle containing EDTA di sodium salt. Hemoglobin was estimated using Cyanmethemoglobin method (Dacie and Lewis, 1975).

## RESULTS AND DISCUSSIONS

The study group comprised of 51.5% 14-15 years age group adolescent girls and 48.5% 15-16 years age group girls. Among 68 adolescent girls, 42.6% were students, 11.8% involved in household work, and 45.6% were labourers. 70.6% of the subjects belonged to nuclear families and 29.4% to joint families. The family size was 4-6 members for majority of the subjects (73.5%) followed by 7-9 members (26.5%). The details are given in the table 1.

Results of anthropometric measurements shows that the subjects had about 93% of the NCHS standard height, indicating reasonably good linear growth, given in the table 2. However, their weights were normal for 78.8% of 14 years and 74.6% of 15 years subjects. Majority of the subjects were normal (48.53%) with weight for age >80% of the standard and among malnourished subjects, 42.64% were mildly malnourished and 8.83% were classified as being in grade -II degree of malnutrition. None of the subjects were severely malnourished (Table 3).

From the table 4, it is evident that a majority, 78% of the subjects had BMI above 17.8 and BMI was below 16 for 2.94% of the subjects. The average BMI of the study group was  $18.0 \pm 1.16$ . Kaushik et al. (2008) reported a prevalence of under nutrition as 36.94% among rural adolescent girls of West Bengal, India. Joshi et al. (2014) reported a prevalence of 69% under nutrition among adolescent girls in the rural area of Bhopal District. Anand et al (1999) reported prevalence of thinness among the school going adolescent girls varies between 4% to 59%, as per the NCHS norms. Goyle study revealed that about 72% of the subjects were undernourished Soumyajit Maiti study revealed 71.8% of the subjects as per weight for age criterion were suffering from various degrees of malnutrition. In H.R. Shivaramakrishna study, 73.5% girls were under nourished. Nagamani et al (2015) reported 35% of adolescent girls had BMI <18.5 in their study. De, K. (2016)

reported a 35.8% adolescent's girls have prevalence of underweight in his study.

The prevalence of anemia among the 68 girls of 14-16 year age group is given in Table 5. On the whole 78% of the girls were anemic and the mean hemoglobin level of the subjects was  $10.94 \pm 1.9$  g/dl. About 45.6% of the subjects had mean hemoglobin levels of 11g/dl which indicates mild deficiency, while 30.9% of them were moderately anemic with hemoglobin at 9.2g/dl. Severe cases of anemia were not seen. Thus, only 22% of the subjects were normal with hemoglobin at 13.5 g/dl. Other studies, in India have indicated high anemia prevalence among adolescent girls. Chaturvedi et al (1996) reported a prevalence of 73.7% among the adolescent girls in Rajasthan. Vijayalakshmi (2000) reported 82% anemia prevalence among adolescent girls of rural Ranga Reddy district. Adolescent girls are vulnerable to anemia due to loss of iron from the body with the onset of the menstrual cycle. Moreover, their intake of iron rich foods and iron absorption enhancers is poor. Goyal et al. (2015) have reported that the prevalence of anaemia of 48.18% and mean hemoglobin 11.35 g/dl. Koushik et al. (2014) reported a prevalence of 77.33% among adolescent girls.

Results of the diet survey show that none of the foods except other vegetables were consumed to the extent recommended. While consumption of other vegetables was 160.9% of ICMR recommendations, the intake of roots and tubers was 59.1% and that of green leafy vegetables was only 41.5% of RDA. Milk intake was very low, being only 24% of RDA. The cereal and pulse intake was 81% and 72% of RDA respectively (Table 6). Diet survey with respect to nutrient intake shows that diets consumed did not meet the nutritional requirements of the subjects (Table7). Iron intake was particularly low and met only 48% of RDA. The RDAs for zinc and Vitamin A were met only to 68.6% and 74.9% respectively.

Results of statistical analysis are given in table 8 and 9 and from this, it is evident that there is a positive correlation between hemoglobin with body mass index and weight of the subjects.

**Table 1: General Information of the Subjects**

S. No	Details	Number (%)
Age	14-15 years	35(51.5)
	15-16 years	33(48.5)
Occupation	Student	29(42.6)
	Household work	8(11.8)
	Laborer	31(45.6)
Type of family	Nuclear	48(70.6)
	Joint	20(29.4)
Family size	4-6 members	50(73.5)
	7-9 members	18(26.5)
	>9 members	Nil

**Table 2: Anthropometric Data of Adolescent Girls**

S. No	Age (Years)	Mean Height (cm)	NCHS Standard (cm)	% Standard	Mean Weight (kg)	NCHS Standard (kg)	% Standard
1	14-15(n=35)	149.80	160.8	93.0	40.3	51.2	78.8
2	15-16(n=33)	149.86	161.97	92.5	40.6	54.4	74.6
		149.83 $\pm$ 3.9	161.835	92.8	40.45 $\pm$ 3.5	52.8	76.6

**Table 3: Classification of the Subjects Based on Weight for Age**

S. No	Degree of Malnutrition	Range	Number of Subjects (%)
1	Normal	>80%	33(48.53)

2	Grade I	70-80%	29(42.64)
3	Grade II	60-70%	6(8.83)
4	Grade III	50-60%	-
5	Grade IV	<50%	-
	Total		68(100)

Ref: Indian Academy of Pediatrics (1972)

**Table 4: Classification of Subjects Based on BMI**

S. No	BMI	Number (%)	Mean BMI
1	>18.5	24(35.3)	19.17
2	17.0-18.5	29(42.64)	17.8
3	16.0-17.0	13(19.12)	16.5
4	<16.0	2(2.94)	15.7
	Total	68(100)	18.0±1.16

**Table 5: Hemoglobin Status of Subjects**

S. No	Groups	Cut off Values	No. of Subjects	Mean Hb Levels g/dl
1	Non anemic	12g/dl	15 (22%)	13.57
2	Mild	10 -11.99 g/dl	31 (45.6%)	11.0
3	Moderate	7 – 9.99 g/dl	21 (30.9 %)	9.2
4	Severe	< 7 g/dl	1 (1.5%)	6.8
<b>TOTAL</b>		<b>68 (100%)</b>		<b>10.94±1.9</b>

**Table 6: Mean Food Intake of the Subjects**

S. No	Food	Quantity Consumed/Day	RDA*	%RDA
1	Cereals	284	350	81.0
2	Pulses	50	70	71.8
3	Green leafy vegetables	63	150	41.5
4	Roots & tubers	44	75	59.1
5	Other vegetables	121	75	160.9
6	Milk and milk products	60	250	24.0
7	Fats and oils	18	35	51.1
8	Sugar and jiggery	19	30	61.7

**Table 7: Mean Nutrient Intake of the Subjects**

S. No	Nutrient	Dietary Intake by Subjects	RDA*	% RDA Met by Diet
1	Energy (K Cals)	1636	2060	79.4
2	Protein (g)	46.7	65	71.8
3	Fat ( g)	18.4	22	83.4
4	Iron (mg)	13.5	28	48.0
5	Calcium (mg)	304	600	50.7
6	Zinc (mg)	10.6	15.5	68.6
7	Vitamin A (µg)	1797	2400	74.9
8	Vitamin C ( mg)	61.6	40	154
9	Thiamin (mg)	0.887	1.0	88.7
10	Riboflavin (mg)	0.83	1.2	69.2
11	Niacin (mg)	12.5	14	89.3

**Table 8: Nutritional Status of 14-16 Year Old Adolescent Girls**

S. No	Variable	Mean Value		Z-Value	Mean Value (Average = 14-16 years) n = 68
		14 Years (n = 35)	14 Years (n = 33)		
1	Haemoglobin (g/dl)	10.6±1.49	11.2±2.2	1.144NS	10.9±1.9

2	Height (cm)	149.6±3.5	149.86±4.1	0.064NS	40.5±3.5
3	Weight (kg)	40.3±3.7	40.65±3.76	0.330NS	40.5±3.5
4	Height/age (%standard)	93.2±2.7	91.3±5.3	1.9388NS	92.3±4.3
5	Weight/age (%standard)	78.2±6.5	72.7±8.4	3.0479**	75.5±8.07
6	BMI	17.95±1.25	16.04±1.03	0.3193NS	18.0±1.15

**\*\*Significant at 1% level; NS: Non-significant**

**Table 9: Correlation between Hemoglobin and Other Variables**

S. No	Variable Studied	'r' Value (hemoglobin)
1	Hemoglobin	1.000
2	Height	0.1066
3	Weight	0.4075**
4	BMI	0.4552**

## CONCLUSIONS

From the study, it is evident that prevalence of anemia and malnutrition is more among the subjects. It is essential to implement adolescent friendly health services as recommended by the World Health Organization (WHO) to improve the nutritional status. Implementing this will decrease the poorly nourished adolescent mothers, who are more likely to give birth to low birth-weight babies, perpetuating a cycle of health problems which pass from one generation to the next. Nutrition and health education through schools and anganwadi centers should be given to combat nutrient deficiencies. Maintaining of kitchen gardens should be encouraged so that the green leafy vegetable production is increased and thereby consumption. Girls to girl child approach in which a girl in school is attached to 3-4 girls who are not school going. The girl educated in the school will educate the rest of four girls. The people should be encouraged to keep their surroundings clean, drink clean water, and eat green leafy vegetables, milk and other locally available nutrient rich foods in adequate amounts.

## REFERENCES

1. Thimmayamma B.V.S., Rao, P and Rao K.V. 1982. Socioeconomic status, diet, and nutrient adequacies of different population groups in urban and rural Hyderabad. *The Indian Journal of Nutrition and Dietetics*. 19:173-183
2. Anand, K., Kant, S and Kapoor, S.K. *From the Comprehensive Rural Health Services Project, Ballabgarh, All India Institute of Medical Sciences, New Delhi 110029, India*
3. BeenaSachan, M.Z., Idris, Savita Jain, ReemaKumari and Ashutosh Singh. 2013. Nutrient Intake Among School going Adolescent Girls in Lucknow district, India. *Journal of Biomedical and Pharmaceutical Research*. 2(4): 20-25
4. CH Maliye et al. Nutrient Intake Amongst Rural Adolescent Girls of Wardha. *Indian J Community Med*. 2010 July; 35(3): 400–402. 13
5. Chaturvedi S, Kapil U, Gnanasekharan N, Sachdev HPS, Pandey RM and Banti T 1996 Nutrient intake among adolescent girls belonging to poor socio economic groups in rural area of Rajasthan. *Indian Pediatrics*. 33(3): 197-201
6. De, K. 2016. A Comparative Study on Nutritional Status of Adolescents Girls of Different Rural Area of West Bengal. *Anthropol* 4: 173
7. Goyal, N., Rawat, C.M.S. and Jha, S.K. (2015). Prevalence of anaemia among school adolescent girls. *Indian Journal of Community Health*. 27(3):398-401
8. Goyle A. 2009. Nutritional status of girls studying in a government school in Jaipur city as determined by anthropometry.

- Anthropologist*. 11: 225-227
9. International Institute for Population Sciences and Macro International. National family health survey India (NFHS-3), 2005-06. Volume I. Mumbai: IIPS; 2007. p304
  10. Kalhan, M., Vashisht B, Kumar V et al. 2010. Nutritional status of adolescent girls of rural Haryana. *Internet J Epidemiol*. 8(1)
  11. Kaushik Bose and Samiran Bisai. 2008. Prevalence of undernutrition among rural adolescents of West Bengal, India. *Journal of Tropical Pediatrics*. 2008. 54 (6): 422-423
  12. Nagamani, N. G and Krishnaveni, A. 2015. A Study on Nutritional Status among Adolescent Girls in Urban Slums of Visakhapatnam City, Andhra Pradesh State. *IOSR Journal of Dental and Medical Sciences*. 14(6). 24-26
  13. Nalluri, K.K., Bollu, M., Ramarao, N.V., Nirojini, P.S., Ramarao, N. 2014. Prevalence of Anaemia Among the Adolescent Girls: A three months cross sectional study. *World Journal of Pharmacy and Pharmaceutical Sciences*. 3(12): 827-836
  14. National Nutrition Monitoring Bureau. Diet and nutritional status of rural population, Hyderabad: National institute of Nutrition, Indian Council of Medical Research. 2002. p91
  15. Nutritive Value of Indian Foods. Gopalan, C., Ramashasthri, B.V and Balasubramanian, S.C. (Eds.). National Institute of Nutrition. 201
  16. Reference data for obesity: 85th and 95th percentiles for body mass index (wt/ht<sup>2</sup>) *Am J Clinical Nutr* 1991; 53: 839-846
  17. Shivaramakrishna, A.V. Deepa, M. Sarithareddy Al Ameen. 2011. *Journal of Medical Sciences*. 4 (3 ):243-246
  18. Venkaiah K, Damayanti K, Nayak MU, Vijayaraghavan K. 2002. Diet and nutritional status of rural adolescents in India. *European Journal of Clinical Nutrition*. 56: 1119–1125
  19. Vijayalakshmi V, Sharada D and Venkataramana 2000. Measurement of physical work performance of adolescent girls – a simple field technique. *The Indian Journal of Nutrition and Dietetics*. 37: 325- 330
  20. World Health Organization. *Measuring Change in Nutritional Status*. Geneva, World Health Organization 1983; pp 63-74
  21. World Health Organization. *Physical status: the use and interpretation of anthropometry*, Technical Report Series No. 854, 1995. Geneva
  22. World Health Organization. *Physical Status: The Use and Interpretation of Anthropometry*. Technical Report Series 854. Geneva, World Health Organization, 1995; pp 263-308